

CLAIM:

1. A method of genotyping one or more animals for selecting traits capable of modulating product quality and/or productivity comprising:
 - a) obtaining a biological sample from at least one animal;
 - b) detecting at least one polymorphism in the porcine leptin receptor (pLEPR) gene; wherein the polymorphism causes a polymorphism in the pLEPR protein, detecting a polymorphism in the pLEPR protein; and/or detecting a pLEPR gene polymorphism that is in linkage disequilibrium with a pLEPR gene polymorphism that causes a polymorphism in the pLEPR protein; and
 - c) establishing the genotype of the animal from which each biological sample was obtained and
 - d) selecting the animal having the genotype to provide the selected trait.
2. The method of claim 1 wherein the traits are selected from one or more of the group consisting of average feed intake, average daily weight gain, muscle mass, back fat, water holding capacity, meat color, meat pH, intramuscular fat, meat tenderness, and/or cooking loss.
3. The method of claim 1 wherein the polymorphism in the pLEPR protein is a threonine/methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein.
4. The method of claim 1 wherein the presence or absence of the polymorphism is determined by a method selected from the group consisting of: DNA sequencing, restriction fragment length polymorphism (RFLP) analysis, heteroduplex analysis, single strand conformational polymorphism (SSCP) analysis, denaturing gradient gel electrophoresis (DGGE), real time PCR analysis (TAQMAN®), temperature gradient gel electrophoresis (TGGE), primer extension, allele-specific hybridization, INVADER® genetic analysis assays, and immunoassay.
5. The method of claim 1 wherein the pLEPR gene polymorphism results from the presence of either a thymidine (T) or a cytidine (C) in the second position of the codon encoding amino acid number 69 of the prepro pLEPR protein.

6. A kit for detecting the nature of a polymorphism in the porcine leptin receptor (pLEPR) gene or gene product; wherein the polymorphism produces either a threonine or a methionine at amino acid number 69 of the prepro-pLEPR protein the kit comprising a means for detecting for detecting the polymorphism in the DNA, RNA, and/or protein.
7. The kit of claim 6 whereby the polymorphism is detected by one or more of the following means of detection: DNA sequencing, restriction fragment length polymorphism (RFLP) analysis, heteroduplex analysis, single strand conformational polymorphism (SSCP), denaturing gradient gel electrophoresis (DGGE), polymerase chain reaction (PCR), real time PCR analysis (TAQMAN®), temperature gradient gel electrophoresis (TGGE), enzyme linked immunosorbant assay (ELISA) and other immunoassay; wherein the kit comprises one or more of the following: a restriction endonuclease enzyme, a DNA polymerase, a reverse transcriptase, a buffer, deoxyribonucleotides, an oligonucleotide suitable for use as a DNA or RNA probe, an oligonucleotide suitable for use as a primer in DNA or RNA synthesis, a fluorescent marker, and an antibody.
8. The kit of claim 7 wherein the DNA polymerase enzyme and/or reverse transcriptase enzyme are thermostable.
9. An oligonucleotide suitable for use in a kit according to either of claims 6 or 7.
10. The oligonucleotide of claim 9 which comprises a sequence selected from the group selected from SEQ ID NO:1, 2, and 4–9.
11. The oligonucleotide of claim 9 which has a sequence selected from the group consisting of SEQ ID NO:1, 2, and 4–9.
12. A method of producing pigs comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces either a threonine or methionine residue at amino acid number 69 of the prepro pLEPR protein;
 - b) selecting those pigs having a desired allele;
 - c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele.
13. The method of claim 12 wherein the desired allele produces a threonine residue at amino acid number 69 of the pLEPR protein.

14. A method of enhancing a trait selected from the group consisting of: average feed intake and/or average daily weight gain, backfat, muscle mass, water holding capacity, meat color, meat pH, intramuscular fat, meat tenderness, and/or cooking loss of animals in a pig herd, the method comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine Leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;
 - c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele.
15. A method of increasing the frequency of a desired allele in a pig herd comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;
 - c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele.
16. A pig offspring produced by a method comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;
 - c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele.
17. A pig herd having an increased frequency of a specific allele of the porcine leptin receptor (pLEPR) gene, wherein the herd is produced by a method comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;

- c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele;
 - d) repeating steps a) through c) until an increased allelic frequency is achieved.
- 18. A method of enhancing meat production from a swine herd comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;
 - c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele;
 - d) repeating steps a) through c) until an increased allelic frequency for the desired allele is achieved.
- 19. A method of fixing an allele in a pig population, the method comprising:
 - a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;
 - c) using the selected pigs as sires/dams in a breeding plan to produce offspring; wherein the offspring have an increase frequency of the desired allele;
 - d) repeating steps a) through c) until the allelic is fixed in the population.
- 20. A method of altering the frequency an allele in a pig population, the method comprising:
 - a) screening a first plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) selecting those pigs having a desired allele;

- c) using the selected pigs as sires/dams in a breeding plan to produce as offspring a second plurality of pigs; wherein the second plurality of pigs have an altered frequency of the desired allele, when compared with the first plurality of pigs.
- 21. The method of claim 20 wherein the frequency of the allele is decreased in the second plurality of pigs as compared with the frequency of the allele in the first plurality of pigs.
- 22. The method of claim 20 wherein the frequency of the allele is increased in the second plurality of pigs as compared with the frequency of the allele in the first plurality of pigs.
- 23. A pig population produced by the method of claim 20.
- 24. Offspring produced by the method of claim 20.
- 25. A method of identifying a single nucleotide polymorphism in linkage disequilibrium with the threonine/methionine polymorphism at amino acid 69 of the prepro porcine leptin receptor (pLEPR) protein (T69M polymorphism), the method comprising:
 - a) identifying at least one large-insert genomic clone containing all or a portion of the pLEPR gene;
 - b) determining the sequences of all or a portion of the clone(s);
 - c) identifying target regions in close proximity to the pLEPR gene;
 - d) screening a panel of animals to determine the sequence of the target regions;
 - e) identifying any single nucleotide polymorphisms (SNPs) present in the target regions to provide a set of at least one target SNP;
 - f) determine which of the target SNPs is in linkage disequilibrium with the T69M polymorphism.
- 26. The method of claim 25 wherein the large-insert genomic clone is selected from the group consisting of a bacterial artificial chromosome (BAC), yeast artificial chromosome (YAC), P1 phage, cosmid, fosmid, phage, or plasmid constructs.
- 27. The method of claim 25 wherein the sequence of the clone is determined by a method comprising a of polymerase chain reaction amplification of a portion of the clone.
- 28. The method of claim 25 where the identified target regions are within 5 centiMorgans or 5 million base pairs of the pLEPR gene.
- 29. A method of managing swine comprising:

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- a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene found in the pigs, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) tabulating the identified nature of the allelic variance possessed by each pig;
 - c) utilizing the tabulated variances as part of a program of marker assisted selection and/or marker assisted allocation.
30. A swine herd produced by a method comprising:
- a) screening a plurality of pigs to identify the nature of an allelic variant in the porcine leptin receptor (pLEPR) gene found in the pigs, wherein said allelic variant produces a threonine or methionine polymorphism at amino acid number 69 of the prepro-pLEPR protein;
 - b) tabulating the identified nature of the allelic variance possessed by each pig;
 - c) utilizing the tabulated variances as part of a program of marker assisted selection and/or marker assisted allocation.